

Gujarat Industries Power Company Limited



At. : Nani Naroli, Ta: Mangrol
Dist.: Surat -394112

Six Monthly Report of Vastan Lime Stone Mine

ENVIRONMENTAL MONITORING & ANALYSIS REPORT

For the period of July 2019 to December-2019

Prepared By

ECOSYSTEM RESOURCE MANAGEMENT PVT. LTD.



OFFICE FLOOR, ASHOKA PAVILLION-A, OPP. KAPADIA HEALTH CLUB,
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PREFACE

Consciousness at national level in the industrial sector is increasing day by day with the focus on environment and sustainable development. A good environment management policy requires a constant effort to analyses and monitors various operations and processes, to generate and transmit this information to the inspecting authority.

As per the Air & Water Consent Orders issued by **Gujarat Pollution Control Board** (GPCB) Gandhinagar & also as per the Environment Clearance certificate issued by Ministry of Environment, Forest and Climate Change (MoEF & CC), Govt. of India, New Delhi, it is mandatory to collect the samples of Air/Gaseous emissions and effluent, to analyses the samples from a recognized laboratory and submit the analysis reports to GPCB & MoEF.

Gujarat Industries Power Company Limited (GIPCL) - Surat Lignite Power Plant is situated at Village – Nani Naroli, Tal. Mangrol, Dist. Surat. This company engaged in the generation of Electricity. The Industry has awarded the contract for bimonthly monitoring and analysis to M/s. Ecosystem Resource Management Pvt. Ltd. Surat.

Ecosystem Resource Management Pvt. Ltd. is one of the leading companies in the field of Environmental Consultancy Service Providers in India. ERM has a well-equipped and developed **NABL Accredited and MoEF & CC** recognized laboratory to carry out the analysis in air, stack emission, fugitive emission, water & waste water, noise, soil, and solid waste etc.

Scope of work for Vastan Lime Stone Mine

I. Ambient Air Monitoring:-

Sr. No.	No. of stations & Location	Duration	Frequency	Parameters	Method of Analysis
1.	4 Nos. within the Core & Buffer Zone.	24 hours	Bi-Monthly	PM ₁₀	IS 5182 Part 23 2006/Reaffirmed 2017
				PM _{2.5}	SOP No.WI/5.4/02-B/03, Issue No.1 Date:01/01/2010
				SO ₂	IS 5182 Part II 2001/Reaffirmed 2017
				NO _x	IS 5182(Part VI):2006/Reaffirmed 2017
				CO	IS 5182(Part 10):1999/Reaffirmed 2014

II. Dust Fall Measurement:-

Sr. No.	No. of station and locations	Duration	Frequency	Parameters	Method of analysis
1.	8 Nos. within the Core & Buffer Zone.	One Month	Bi-Monthly	Dust fall	Methods of air sampling and analysis, 3 rd edition by James P. Lodge, JR., Editor

III. Noise Monitoring:-

Sr. No.	Noise of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	10 Nos. at various location within the plant premises	24 hours	Bi-Monthly	Day & night Noise level	Using Sound level Meter

Weather Monitoring:-

Sr. No.	No. of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	1 No. at Site.	24 hours	Bi-Monthly	Dry Bulb & Wet Bulb Temp., Atmospheric Pressure, Relative Humidity, Wind Speed, Wind Direction, Rain Fall and its Min. Max. & Avg. Value	As per IS 8829 on hourly basis for 24 hrs by using mechanical Instrument.

Water Quality Monitoring:-

Sr. No.	No. of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	7 Nos. of Bore well , 2 No. of Surface Water sample located both in Core & Buffer Zone	1	Bi-Monthly	Physical parameters, Chemical Parameters, Heavy metals	As per the standard methods for the examination of water and waste water APHA 23 rd Edition 2017 and various Indian standards IS 3025.

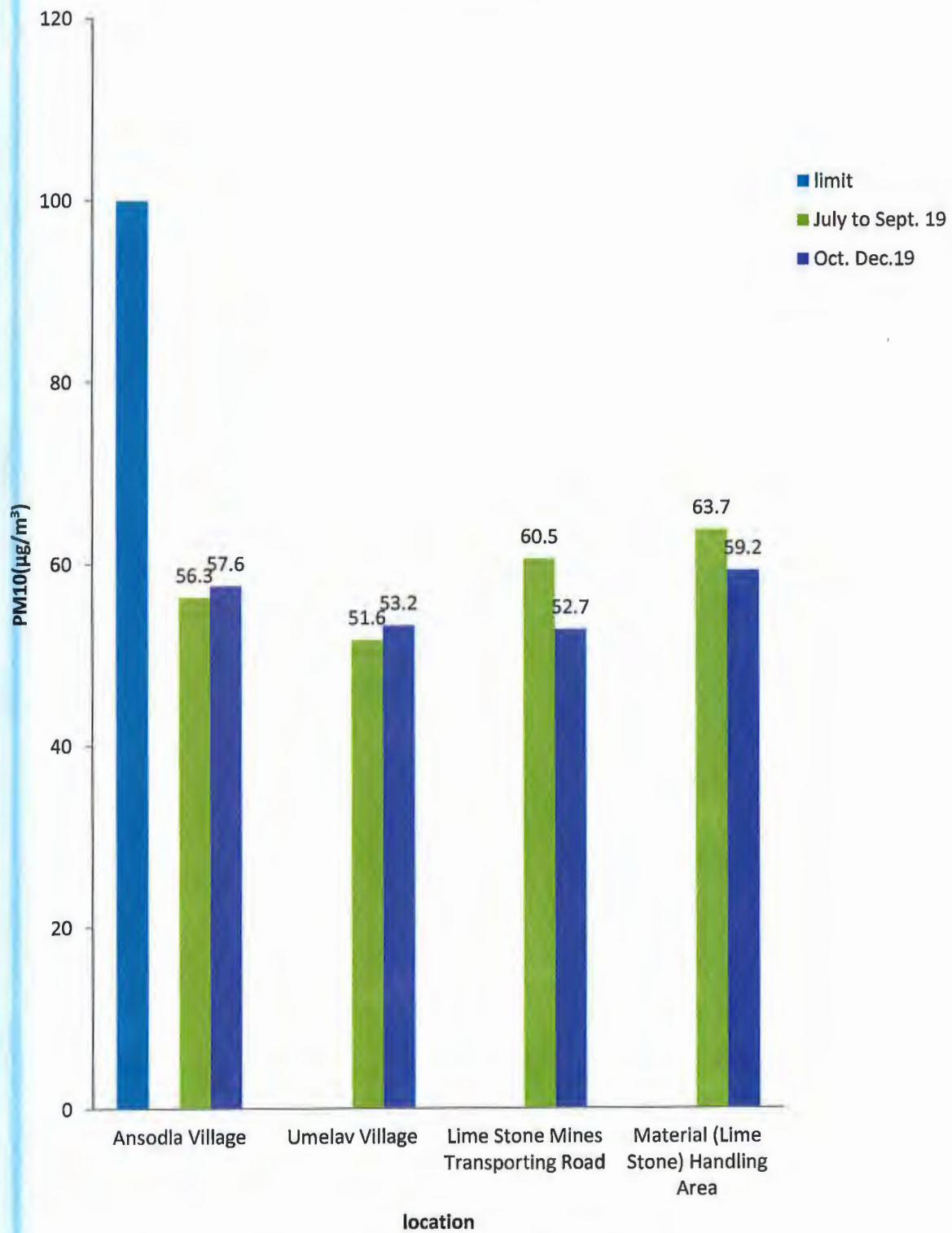
Six Monthly Variations in Ambient Air Quality

Parameter: PM₁₀ (Respirable Particulate Matter)

Period: July – 2019 to December – 2019

Sr. No.	Location	Results ($\mu\text{g}/\text{m}^3$)	
		Quarterly July to Sept. -2019	Quarterly Oct. to Dec. - 2019
1	Ansodla Village	56.3	57.6
2	Umelav Village	51.6	53.2
3	Lime Stone Mines Transporting Road	60.5	52.7
4	Material (Lime Stone) Handling Area	63.7	59.2
	Limit	100	

Graphical presentation for the variation of PM₁₀ in Ambient Air



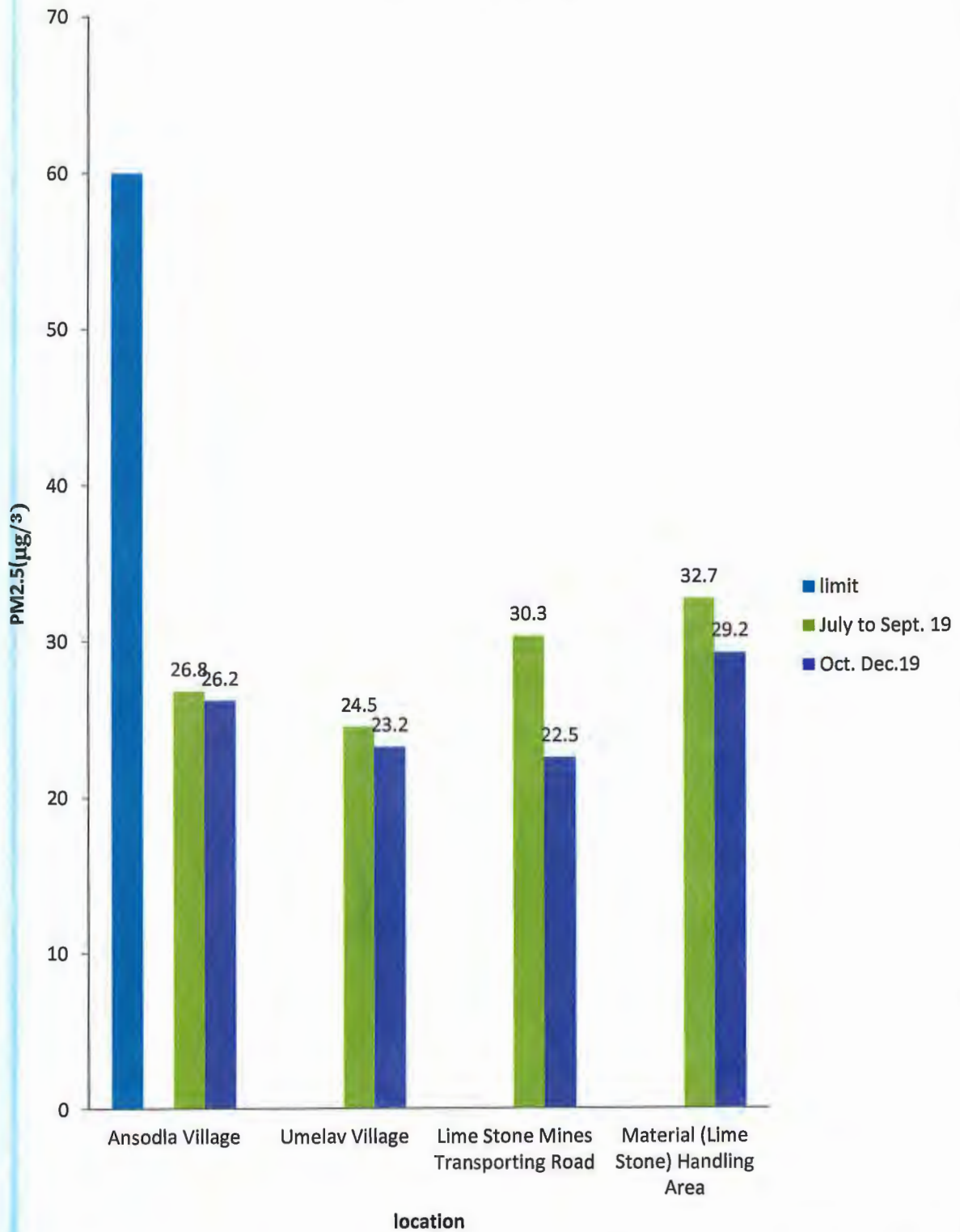
Six Monthly Variations in Ambient Air Quality

Parameter: PM_{2.5} (Respirable Particulate Matter)

Period: July – 2019 to December – 2019

Sr. No.	Location	Results ($\mu\text{g}/\text{m}^3$)	
		Quarterly July to Sept. -2019	Quarterly Oct. to Dec. - 2019
1	Ansodla Village	26.8	26.2
2	Umelav Village	24.5	23.2
3	Lime Stone Mines Transporting Road	30.3	22.5
4	Material (Lime Stone) Handling Area	32.7	29.2
	Limit	60	

Graphical presentation for the variation of PM_{2.5} in Ambient Air



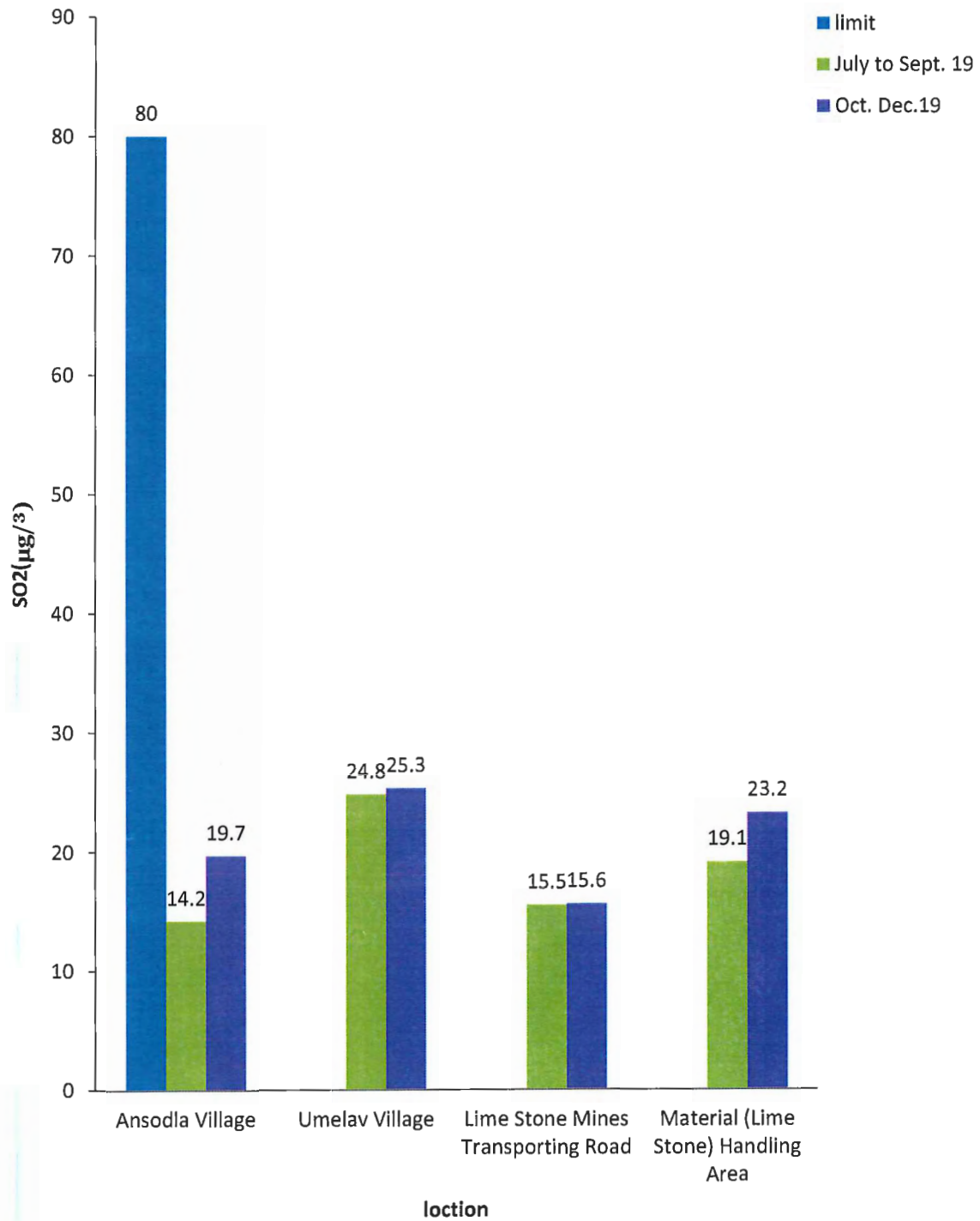
Six Monthly Variations in Ambient Air Quality

Parameter: SO₂ (Sulphur Dioxide)

Period: July – 2019 to December – 2019

Sr. No.	Location	Results ($\mu\text{g}/\text{m}^3$)	
		Quarterly July to Sept. -2019	Quarterly Oct. to Dec. - 2019
1	Ansodla Village	14.2	19.7
2	Umelav Village	24.8	25.3
3	Lime Stone Mines Transporting Road	15.5	15.6
4	Material (Lime Stone) Handling Area	19.1	23.2
	Limit	80	

Graphical presentation for the variation of SO₂ in Ambient Air



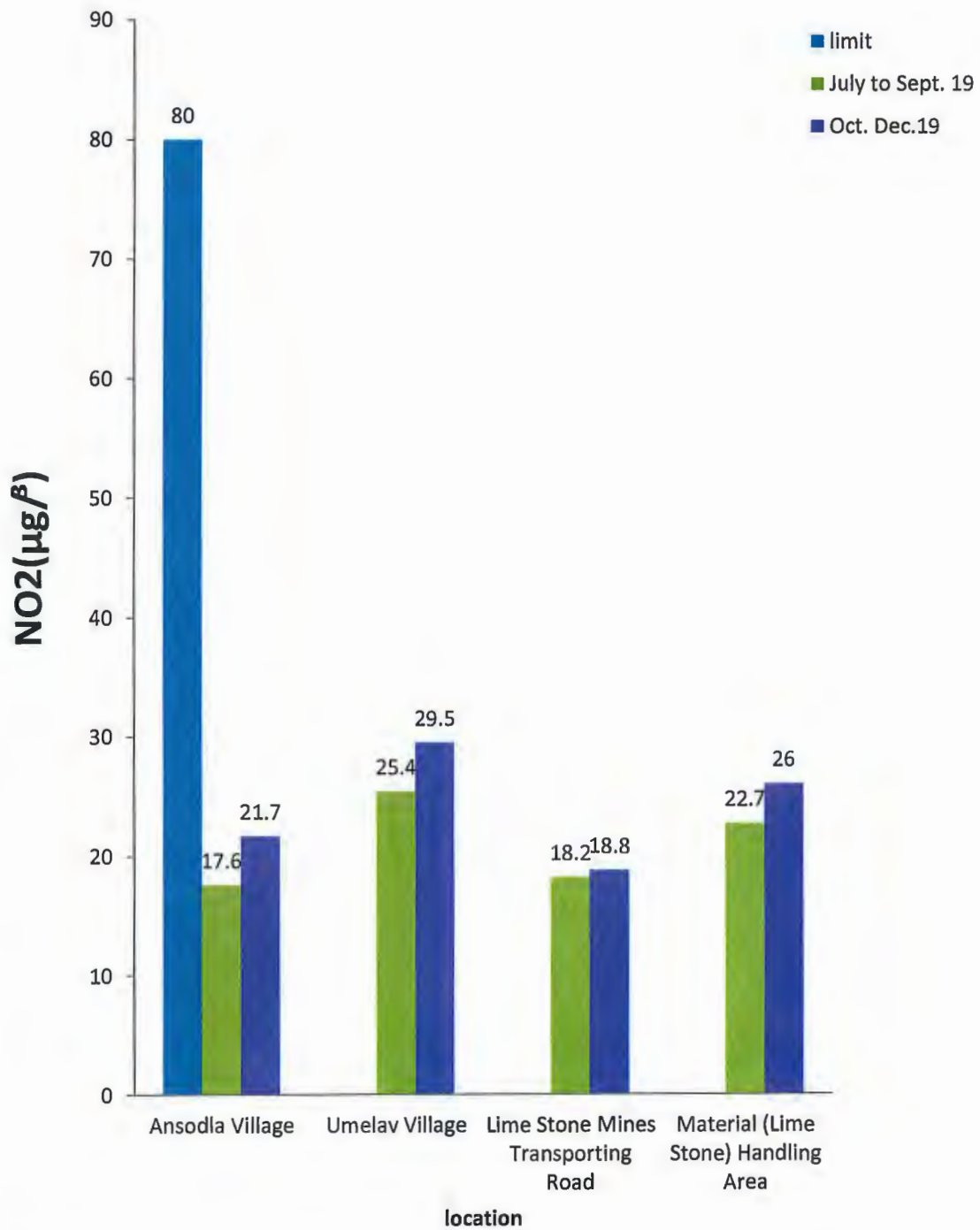
Six Monthly Variations in Ambient Air Quality

Parameter: NO₂ (Nitrogen Di-oxide)

Period: July – 2019 to December – 2019

Sr. No.	Location	Results (µg/m ³)	
		Quarterly July to Sept. -2019	Quarterly Oct. to Dec. - 2019
1	Ansodla Village	17.6	21.7
2	Umelav Village	25.4	29.5
3	Lime Stone Mines Transporting Road	18.2	18.8
4	Material (Lime Stone) Handling Area	22.7	26.0
	Limit	80	

Graphical presentation for the variation of NO₂ in Ambient Air



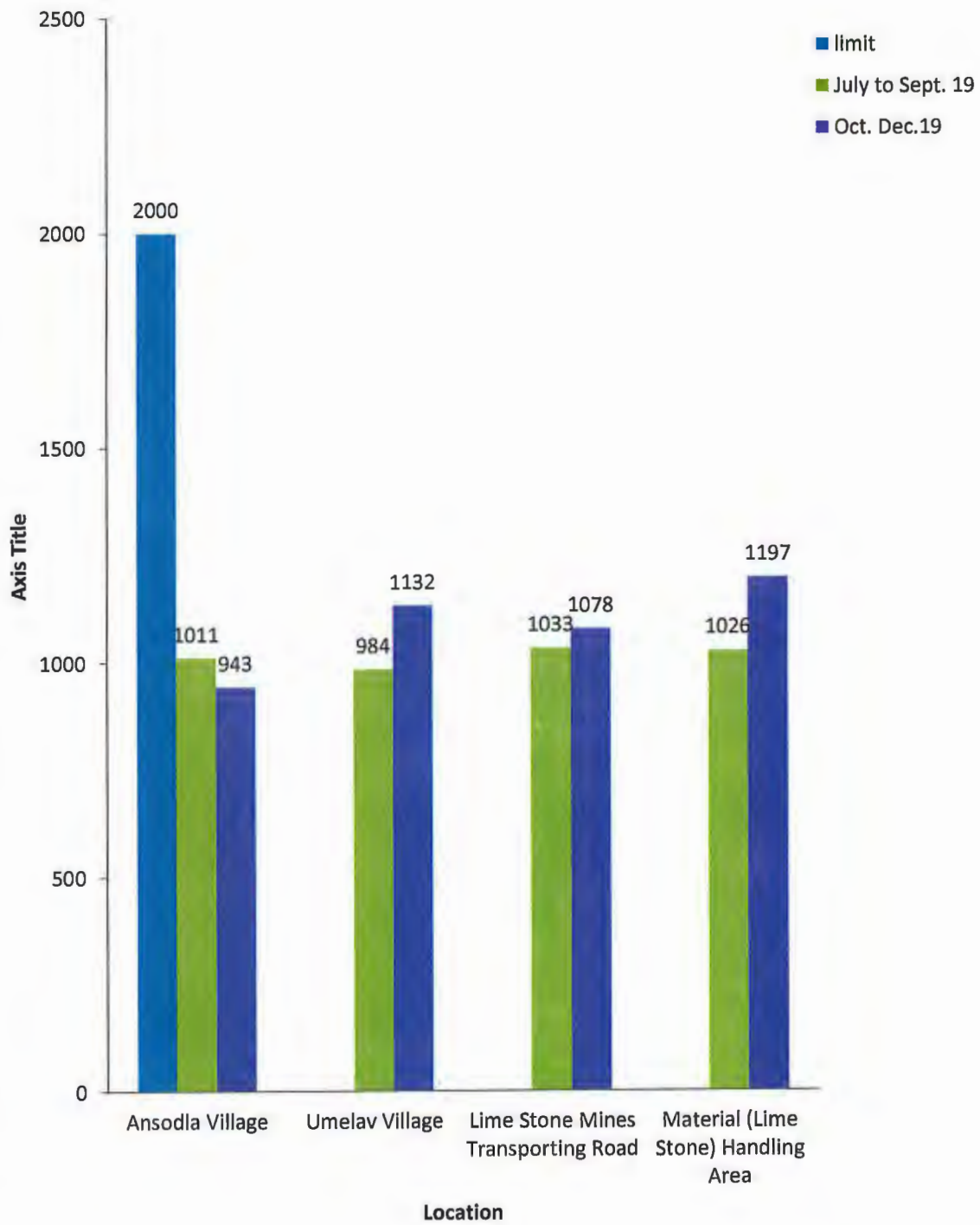
Six Monthly Variations in Ambient Air Quality

Parameter: CO (Carbon Monoxide)

Period: July – 2019 to December – 2019

Sr. No.	Location	Results($\mu\text{g}/\text{m}^3$)	
		Quarterly July to Sept. -2019	Quarterly Oct. to Dec. - 2019
1	Ansodla Village	1011	973
2	Umelav Village	984	1021
3	Lime Stone Mines Transporting Road	1033	921
4	Material (Lime Stone) Handling Area	1026	1103
	Limit	2000	

Graphical presentation for the variation of CO in Ambient Air



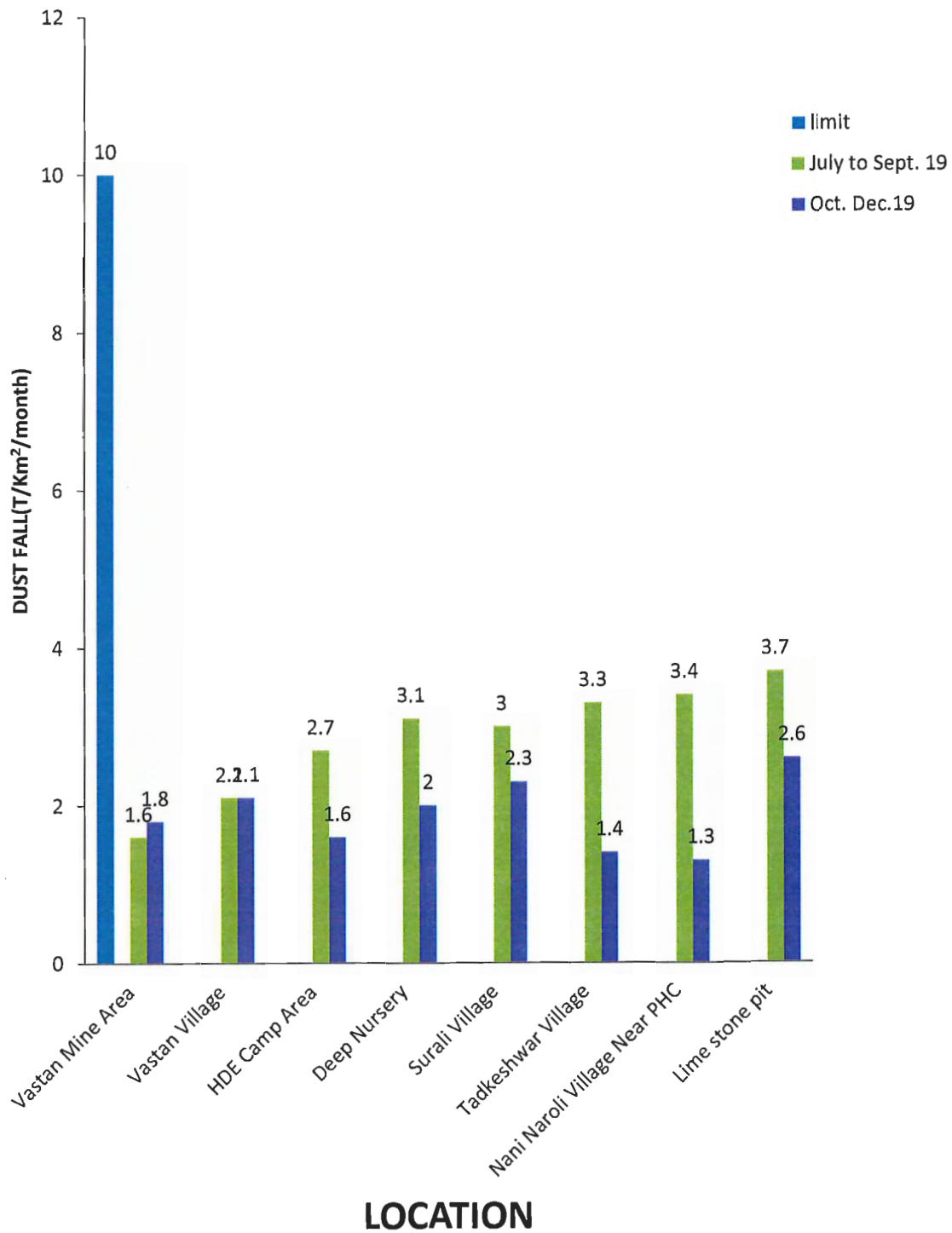
Six Monthly Variations in Ambient Air Quality

Parameter: Dust Fall

Period: July – 2019 to December – 2019

Sr. No.	Location	Results (T/Km ² /month)	
		Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019
1	Vastan Mine Area	1.6	1.8
2	Vastan Village	2.1	2.1
3	HDE Camp Area	2.7	1.6
4	Deep Nursery	3.1	2.0
5	Surali Village	3.0	2.3
6	Tadkeshwar Village	3.3	1.4
7	Nani Naroli Village Near PHC	3.4	1.3
8	Lime stone pit	3.7	2.6
	Limit	10	

Graphical presentation for the variation of Dust Fall in Ambient Air



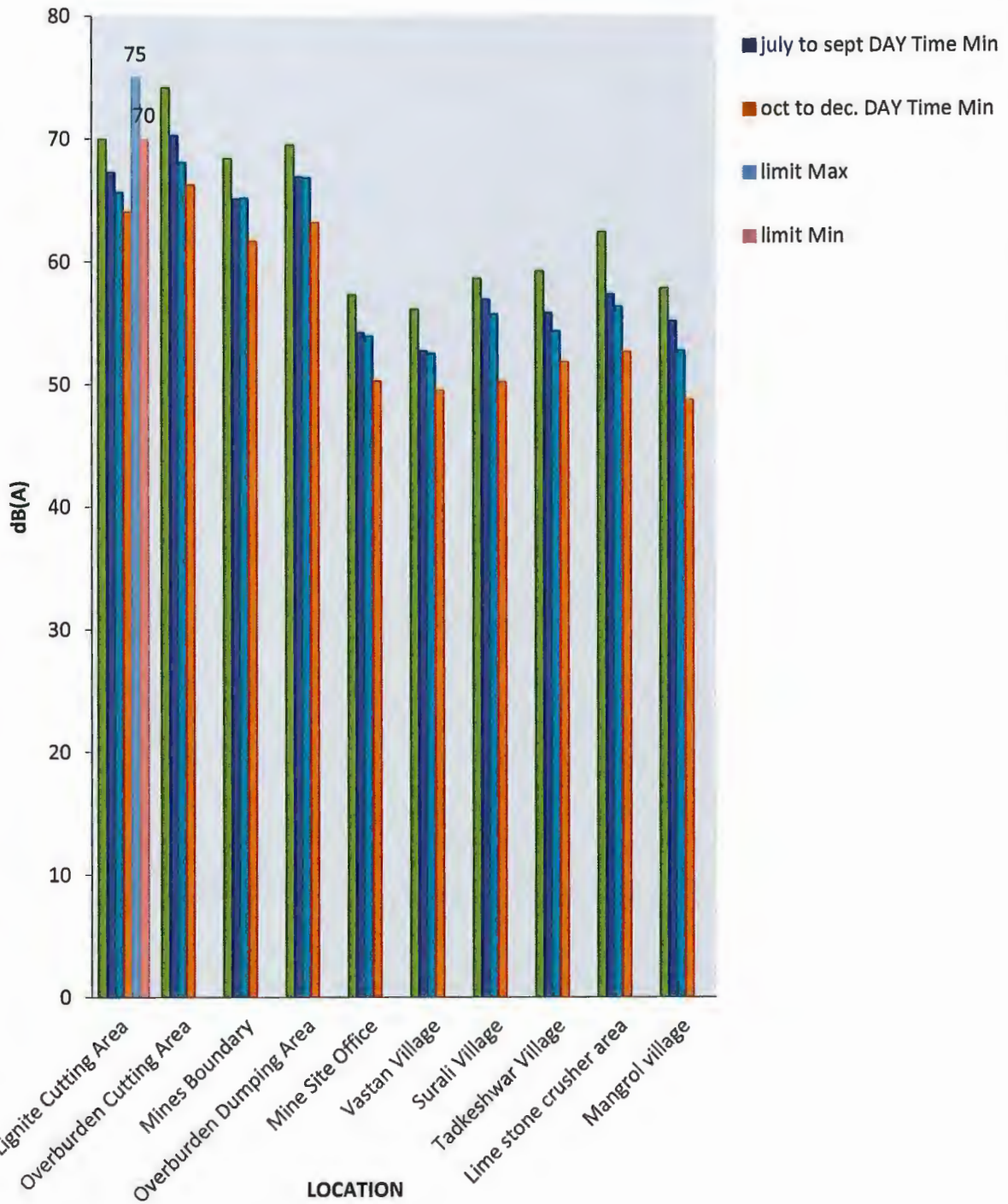
Six Monthly Variations in Noise Level

Parameter: Noise

Period: July – 2019 to December – 2019

SR. NO	LOCATION	NOISE LEVEL, dB [A]							
		Quarterly July to Sept. - 2019				Quarterly Oct. to Dec. - 2019			
		DAY Time		Night Time		DAY Time		Night Time	
		Max	Min	Max	Min	Max	Min	Max	Min
1	Lignite Cutting Area	70.0	67.3	65.7	64.1	63.6	60.0	57.0	55.0
2	Overburden Cutting Area	74.2	70.3	68.1	66.3	65.1	62.0	59.4	55.8
3	Mines Boundary	68.4	65.1	65.2	61.7	60.3	57.8	55.0	51.2
4	Overburden Dumping Area	69.5	66.9	66.8	63.2	64.4	61.0	56.6	53.7
5	Mine Site Office	57.3	54.2	53.9	50.3	56.0	53.4	49.0	45.0
6	Vastan Village	56.1	52.7	52.5	49.5	50.0	47.0	43.1	39.3
7	Surafi Village	58.6	56.9	55.7	50.2	49.8	45.4	42.6	38.6
8	Tadkeshwar Village	59.2	55.8	54.3	51.8	52.3	49.2	44.8	40.1
9	Lime stone crusher area	62.4	57.3	56.3	52.6	58.2	54.2	55.2	53.6
10	Mangrol village	57.8	55.1	52.7	48.7	56.9	52.2	54.1	51.2
	GPCB limit	75 (dB)		70(dB)		75 (dB)		70(dB)	

Graphical presentation for the variation of in Noise level



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Six Monthly Variations in Micrometeorological data

Period: July – 2019 to December – 2019

Dry Bulb Temperature (°C)		
Time in Hrs.	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019
10.00	28.0	23.5
11.00	29.6	25.0
12.00	30.4	29.1
13.00	29.4	28.3
14.00	29.9	27.1
15.00	29.4	28.0
16.00	29.0	27.6
17.00	29.7	26.3
18.00	28.3	25.6
19.00	28.0	24.8
20.00	27.4	23.5
21.00	27.3	23.0
22.00	26.0	23.4
23.00	26.4	23.9
00.00	26.2	22.0
01.00	26.3	22.8
02.00	26.8	22.3
03.00	26.0	22.1
04.00	26.2	21.8
05.00	26.4	21.0
06.00	26.3	20.5
07.00	27.0	20.9
08.00	28.3	21.5
09.00	28.6	22.8
Maximum	30.4	29.1
Minimum	26.0	20.5
Average	27.8	24.1

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Six Monthly Variations in Micrometeorological data

Period: July – 2019 to December – 2019

Wet Bulb Temperature (°C)		
Time in Hrs.	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019
10.00	25.4	22.7
11.00	24.6	23.1
12.00	26.9	27.0
13.00	24.9	26.4
14.00	25.8	25.3
15.00	27.7	26.1
16.00	25.5	25.6
17.00	27.4	24.3
18.00	24.7	22.8
19.00	26.2	23.0
20.00	25.4	20.8
21.00	25.2	20.0
22.00	23.8	21.9
23.00	23.0	21.2
00.00	23.6	20.8
01.00	24.1	20.8
02.00	23.1	21.0
03.00	23.7	21.8
04.00	22.6	19.9
05.00	24.1	20.0
06.00	23.2	18.7
07.00	25.3	19.0
08.00	25.6	18.9
09.00	24.2	20.4
Maximum	27.7	27.0
Minimum	22.6	18.7
Average	24.9	22.2

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Six Monthly Variations in Micrometeorological data

Period: July – 2019 to December – 2019

Relative Humidity %		
Time in Hrs.	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019
10.00	77.7	44.2
11.00	74.9	43.1
12.00	71.4	39.1
13.00	71.0	40.8
14.00	71.3	41.6
15.00	71.5	42.0
16.00	73.8	42.0
17.00	75.8	45.8
18.00	79.6	49.6
19.00	80.8	51.3
20.00	82.3	53.8
21.00	84.5	54.0
22.00	84.2	55.6
23.00	84.4	56.0
00.00	84.0	56.3
01.00	84.3	57.0
02.00	84.7	57.4
03.00	84.6	57.8
04.00	85.3	56.8
05.00	85.6	56.4
06.00	85.3	56.0
07.00	83.3	50.2
08.00	82.7	49.2
09.00	81.2	49.0
Maximum	85.6	57.8
Minimum	71.0	39.1
Average	80.0	50.1

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Six Monthly Variations in Micrometeorological data

Period: July – 2019 to December – 2019

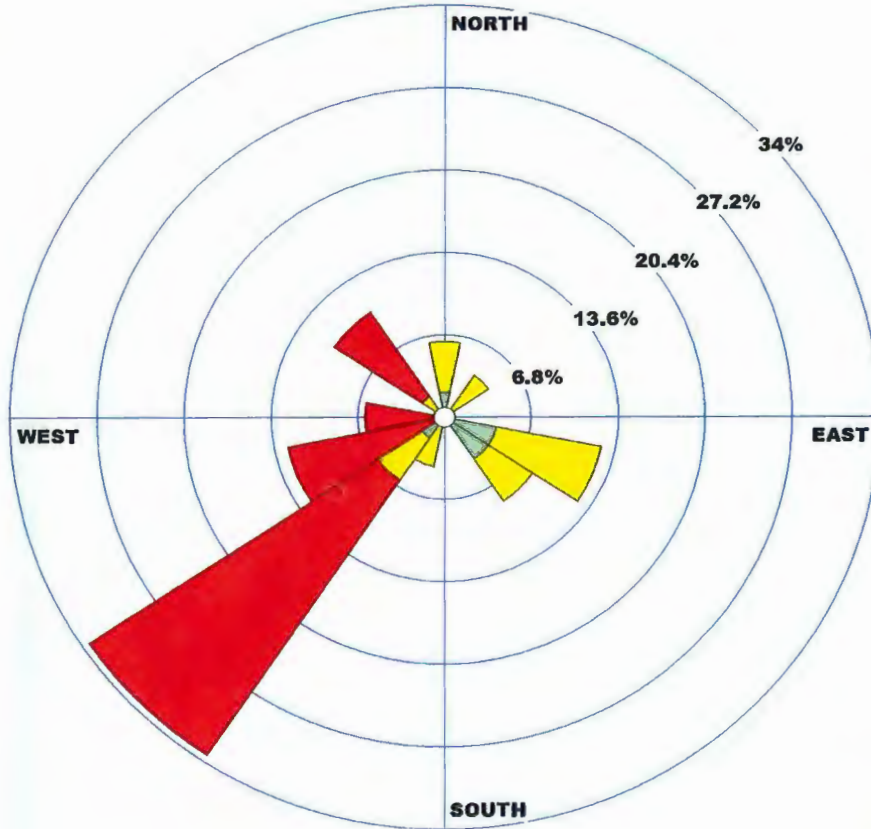
Wind Speed (km/hour)		
Time in Hrs.	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019
10.00	11	11
11.00	13	10
12.00	14	9
13.00	14	8
14.00	15	9
15.00	15	14
16.00	16	11
17.00	16	15
18.00	17	17
19.00	17	16
20.00	16	14
21.00	16	11
22.00	15	10
23.00	16	8
00.00	16	6
01.00	15	5
02.00	16	4
03.00	16	6
04.00	15	5
05.00	14	6
06.00	14	9
07.00	13	8
08.00	12	8
09.00	12	9
Maximum	17.0	17
Minimum	11.0	4
Average	14.7	9.6

WIND ROSE PLOT:

**M/s. Gujarat Industries Power Company Limited
Vastan Lime Stone Mine**

DISPLAY:

**Wind Speed
Direction (blowing from)**



COMMENTS:

DATA PERIOD:

Start Date: 23-08-2019 - 10:00
End Date: 31-12-2019 - 09:00

COMPANY NAME:

M/s. Gujarat Industries Power Company Limited

MODELER:

**M/s. Ecosystem Resource
Management Pvt. Ltd.**

CALM WINDS:

0.00%

TOTAL COUNT:

48 hrs.

AVG. WIND SPEED:

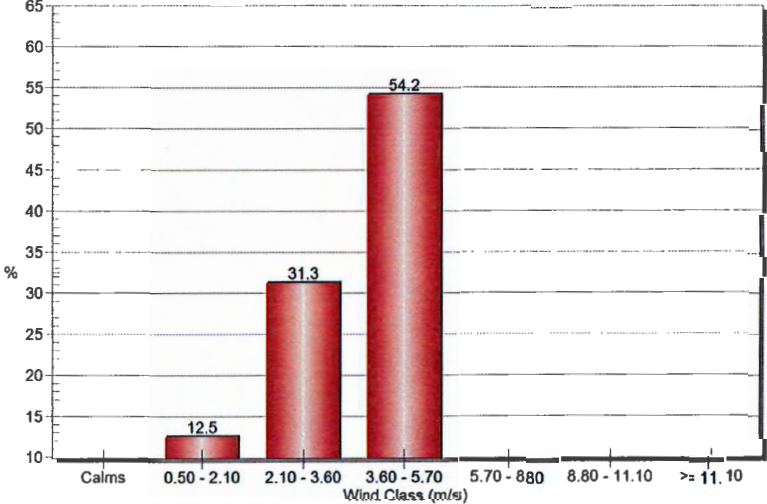
3.38 m/s

DATE:

10-01-2020

PROJECT NO.:

Wind Class Frequency Distribution



Six Monthly Variations in Bore water

Sampling point: Bore well (Ansodla Village)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	26	28	Shall not exceed 5°c above the receiving water temp.
2	pH@ 25°C	pH unit	7.32	7.32	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	3.2	2.1	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1459	1353	2100
6	Total volatile Solids	mg/L	3	2.7	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	789	782	1000
11	Sulphate	mg/L	150	150	300
12	Fluoride	mg/L	0.4	0.45	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.9	1.0	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.05	< 0.05	3.0
23	Calcium	mg/L	210	208	--
24	Magnesium	mg/L	86	85	--
25	Percentage Sodium	%	33.2	32.4	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water Data

Sampling point: Bore well (Hand pump in surali Village)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	26	27	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.36	7.25	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	6.5	6.2	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1496	1603	2100
6	Total volatile Solids	mg/L	4	4.1	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	396	392	1000
11	Sulphate	mg/L	88	95	300
12	Fluoride	mg/L	0.4	0.8	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.7	1.4	--
14	Total Residual Chlorine	mg/L	< 0.10	< 0.10	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.02	< 0.02	1.0
17	Lead	mg/L	< 0.50	< 0.50	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.10	< 0.10	2.0
21	Zinc	mg/L	<0.05	<0.05	5.0
22	Iron	mg/L	489	593	3.0
23	Calcium	mg/L	96	98	--
24	Magnesium	mg/L	27	34	--
25	Percentage Sodium	%	42	40	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water

Sampling point: Bore well (Mosali char rasta)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	27	29	Shall not exceed 5°c above the receiving water temp 5.5-9.0
2	pH@ 25°C	pH unit	7.4	7.36	
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	3.2	2.1	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1584	1497	2100
6	Total volatile Solids	mg/L	3	2.4	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20 °C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	331	331	1000
11	Sulphate	mg/L	220	220	300
12	Fluoride	mg/L	0.4	0.5	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.7	0.8	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.05	< 0.05	3.0
23	Calcium	mg/L	62.4	61.2	--
24	Magnesium	mg/L	40.2	39.5	--
25	Percentage Sodium	%	24.5	24.3	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water

Sampling point: Bore well (Near Tadkeshwar char rasta)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	26	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.22	7.27	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	3	4.2	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1325	1502	2100
6	Total volatile Solids	mg/L	3	3.1	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	165	161	1000
11	Sulphate	mg/L	134	132	300
12	Fluoride	mg/L	0.4	0.8	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.0	1.0	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.05	< 0.05	3.0
23	Calcium	mg/L	76	75	--
24	Magnesium	mg/L	48	48	--
25	Percentage Sodium	%	31.4	30.2	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water

Sampling point: Bore well (Vatsan Village)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	25	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.16	7.24	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	4.2	3.1	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1379	1497	2100
6	Total volatile Solids	mg/L	1.5	1.4	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	351	362	1000
11	Sulphate	mg/L	210	218	300
12	Fluoride	mg/L	0.3	0.6	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.1	0.8	--
14	Total Residual Chlorine	mg/L	< 0.10	< 0.10	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.05	< 0.05	3.0
23	Calcium	mg/L	84	90	--
24	Magnesium	mg/L	50	56	--
25	Percentage Sodium	%	18.6	23.2	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water

Sampling point: Bore well (Hand pump in dungri Village)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	24	29	Shall not exceed 5°C above the receiving water temp
2	pH@ 25°C	pH unit	7.02	7.28	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105°C	mg/L	3.1	3.1	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1402	1542	2100
6	Total volatile Solids	mg/L	2	2.1	--
7	COD	mg/L	--	< 10	250
8	BOD (5 days at 20° C)	mg/L	--	< 4	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	441	431	1000
11	Sulphate	mg/L	183	184	300
12	Fluoride	mg/L	0.3	0.5	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.6	1.1	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	85	93	--
24	Magnesium	mg/L	17	22	--
25	Percentage Sodium	%	15.6	23.1	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water

Sampling point: Bore well (Nani naroli Village)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	26	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.36	7.33	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.0	2.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1293	1402	2100
6	Total volatile Solids	mg/L	2	1.5	--
7	COD	mg/L	--	<10	250
8	BOD (5 days at 20° C)	mg/L	--	<4	30
9	Oil & Grease	mg/L	<1	<1	10
10	Chloride	mg/L	263	266	1000
11	Sulphate	mg/L	11	15	300
12	Fluoride	mg/L	0.4	0.3	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.8	1.1	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	<0.01	<0.01	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.01	<0.01	3.0
19	Hexavalent Chromium	mg/L	<0.03	<0.03	0.1
20	Total Chromium	mg/L	<0.03	<0.03	2.0
21	Zinc	mg/L	<0.1	<0.1	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	66	73	--
24	Magnesium	mg/L	23	29	--
25	Percentage Sodium	%	18.4	21.3	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

Six Monthly Variations in Bore water

Sampling point: Bore well (Limestone pit)

Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	25	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.7	7.42	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	20	17	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1722	1783	2100
6	Total volatile Solids	mg/L	16	12	--
7	COD	mg/L	40	42	250
8	BOD (5 days at 20° C)	mg/L	8	9	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	840	852	1000
11	Sulphate	mg/L	157	156	300
12	Fluoride	mg/L	0.4	0.9	2.0
13	Phosphate as PO ₄ ⁻	mg/L	1.3	1.3	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	0.06	0.08	0.1
18	Copper	mg/L	0.57	0.51	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	0.10	0.15	5.0
22	Iron	mg/L	0.1	0.3	3.0
23	Calcium	mg/L	160	167	--
24	Magnesium	mg/L	80	84	--
25	Percentage Sodium	%	36.4	40.3	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	90	90	90%Survival of fish after 96 Hours in 100% of effluent

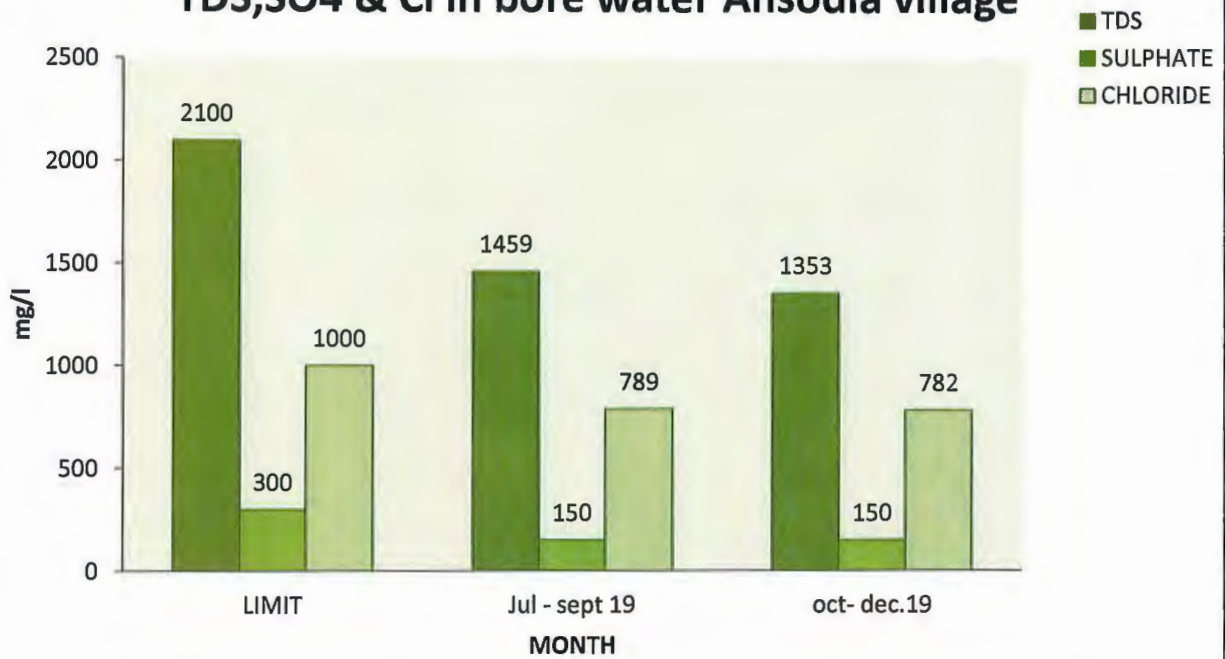
Six Monthly Variations in Bore water

Sampling point: Bore well (Pond water Vastan village)

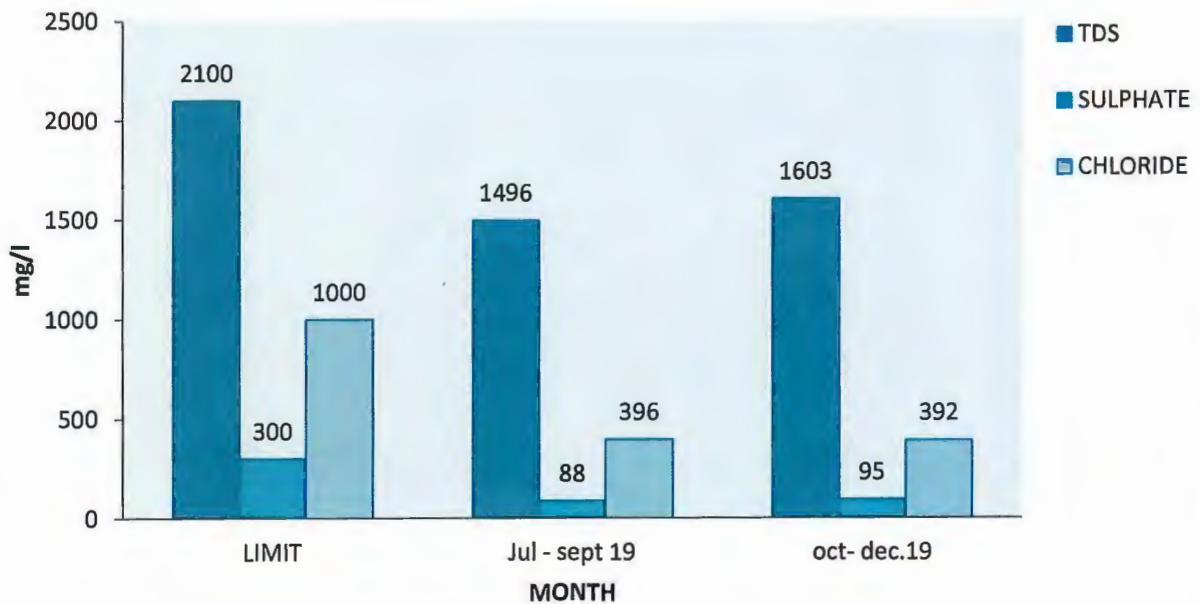
Period: July – 2019 to December – 2019

Sr. No.	Parameter	Unit	Quarterly July to Sept. - 2019	Quarterly Oct. to Dec. - 2019	MoEF Limit
1	Temperature	°C	26	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.2	7.27	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105°C	mg/L	15	13	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1012	1125	2100
6	Total volatile Solids	mg/L	<1	<1	--
7	COD	mg/L	<10	<10	250
8	BOD (5 days at 20° C)	mg/L	<4	<4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	240	249	1000
11	Sulphate	mg/L	208	195	300
12	Fluoride	mg/L	0.3	0.4	2.0
13	Phosphate as PO ₄ ²⁻	mg/L	1.1	1.0	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	<0.02	<0.02	0.1
18	Copper	mg/L	<0.50	<0.50	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	<0.10	<0.10	5.0
22	Iron	mg/L	<0.05	<0.05	3.0
23	Calcium	mg/L	64	71	--
24	Magnesium	mg/L	22	29	--
25	Percentage Sodium	%	17.3	22.2	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish after 96 Hours in 100% of effluent

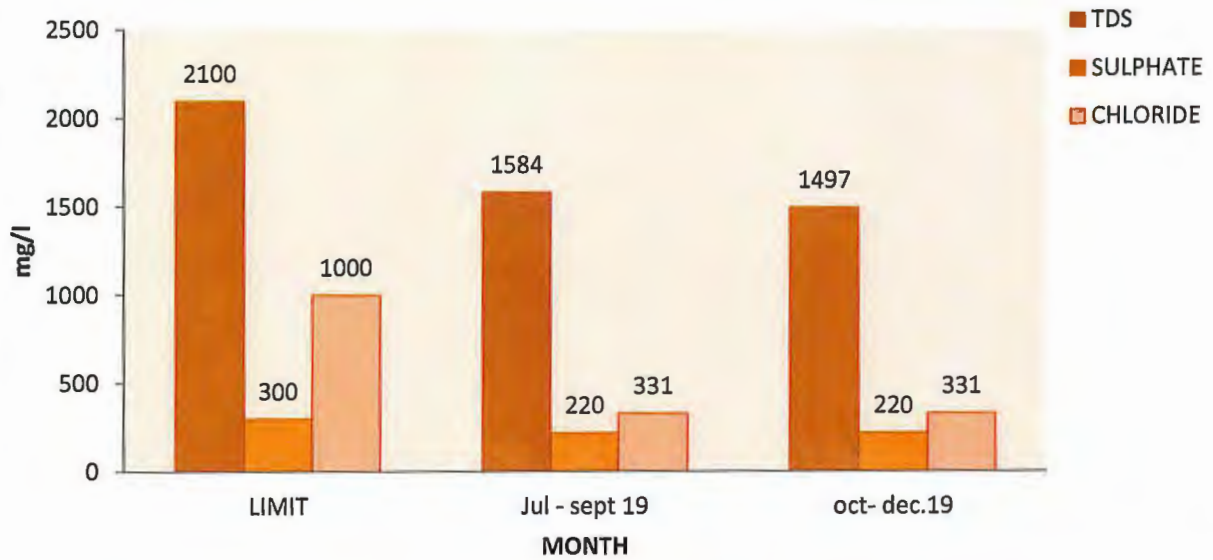
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Ansodla village



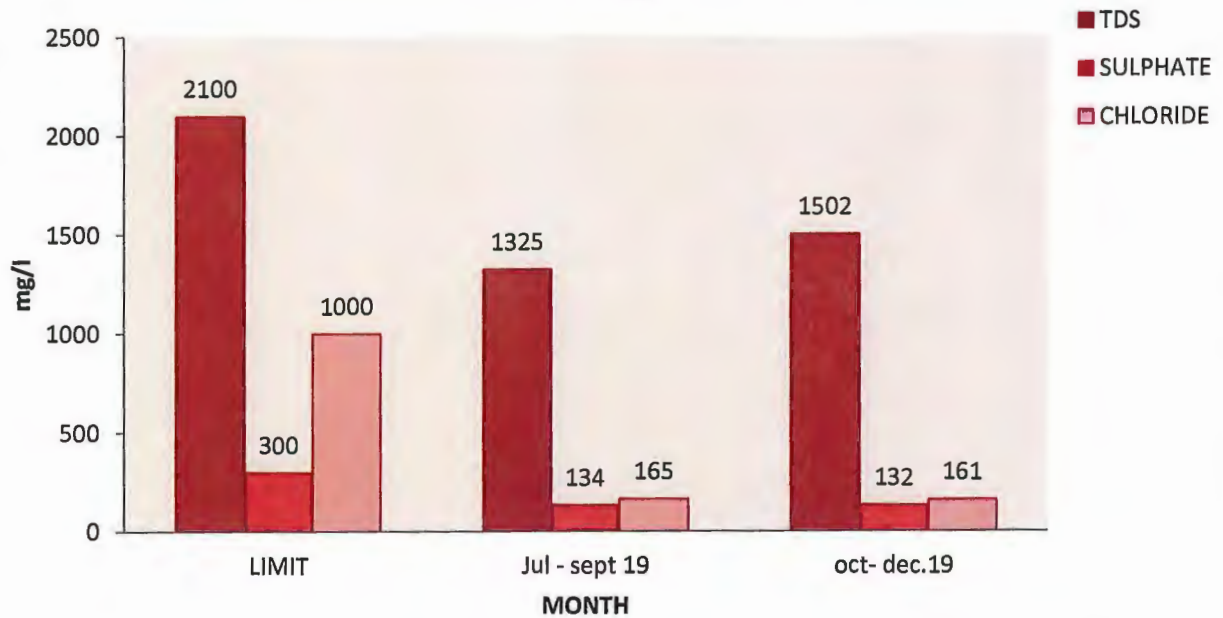
Graphical presentation for the variation of TDS & TSS in bore water Hand pump in Surali village



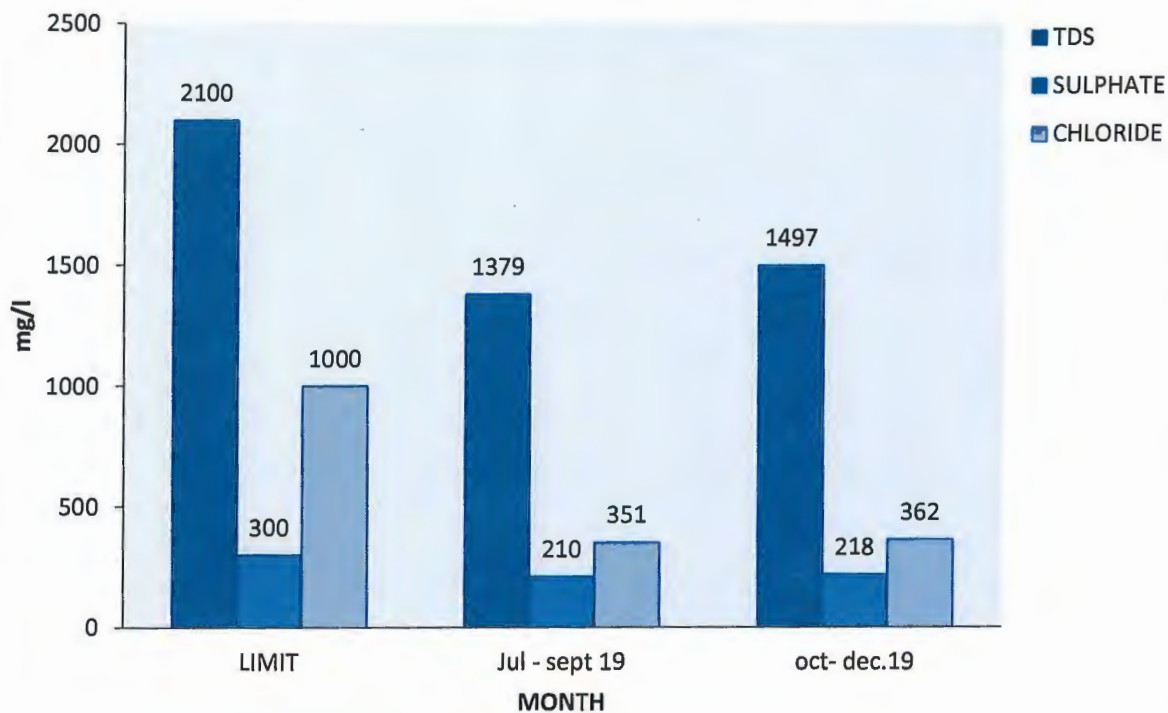
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Mosali char rasta



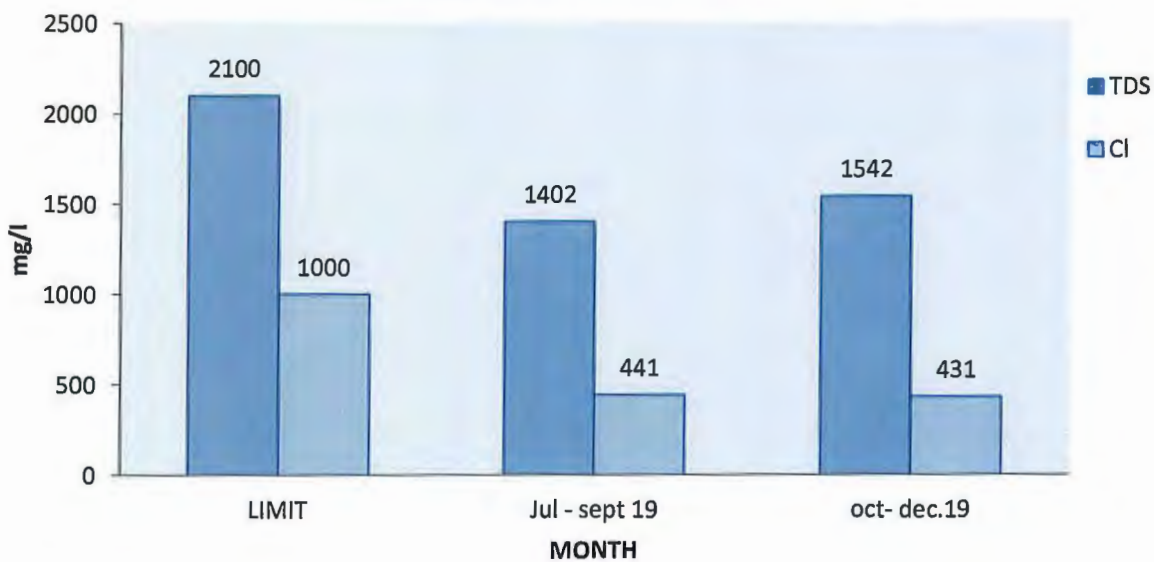
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Near Tadkeshwar village



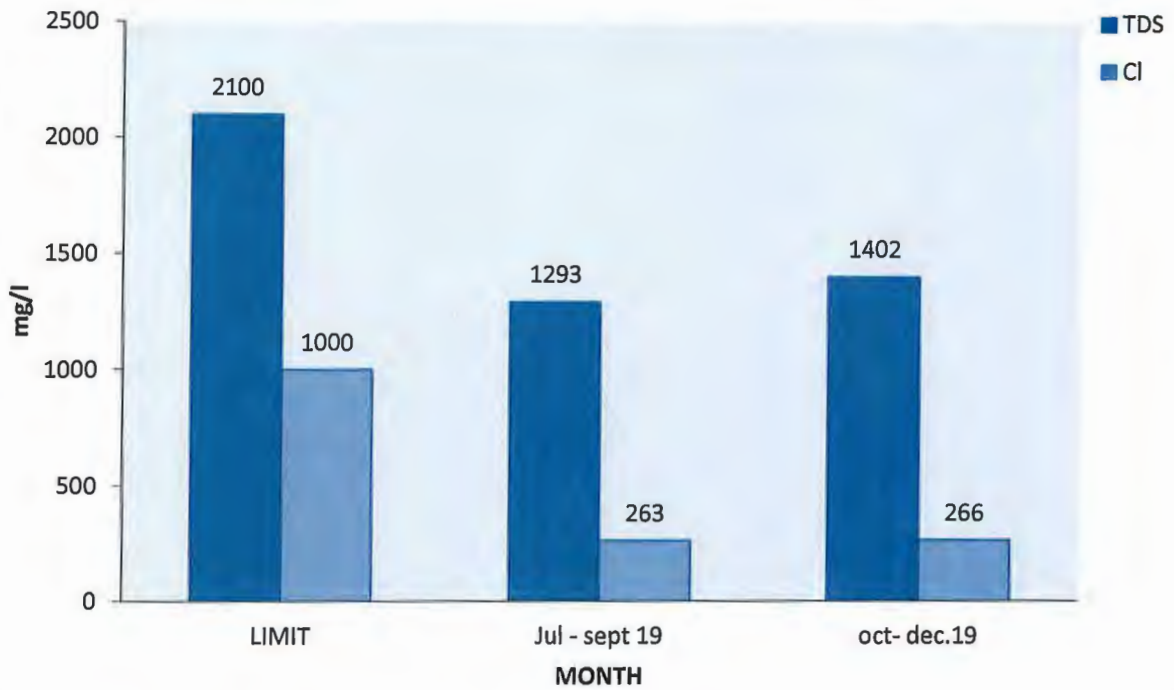
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Vatsan village



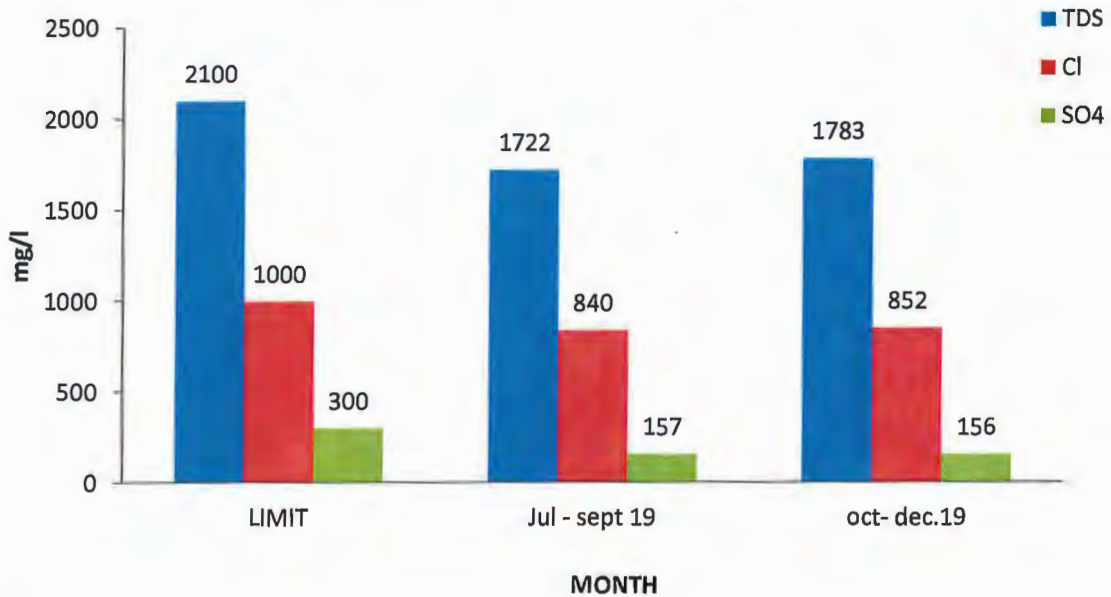
Graphical presentation for the variation of TDS & Cl in bore water Hand pump in dungri village



Graphical presentation for the variation of TDS & Cl in bore water Nani naroli village



Graphical presentation for the variation of TDS,SO4 & Cl in lime stone pit



Graphical presentation for the variation of TDS,SO4 & Cl in Pond water VASTAN village

